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IN THE CLAIMS

1. (Original) A method of authenticating that a test polymer is an authenticatable polymer, wherein the authenticatable polymer comprises a substrate polymer and a thermochromic compound, the thermochromic compound having a first signal at a first temperature and at an authenticating wavelength, and a second signal at an authenticating temperature and the authenticating wavelength, the first and second signals being different, and the authenticating temperature being greater than the first temperature, the method comprising

subjecting the test polymer to a stimulus sufficient to raise a portion of the test polymer to the authenticating temperature to create a heated portion,

determining a test signal of the heated portion of the test polymer at the authenticating wavelength, and

authenticating that the test polymer is an authenticatable polymer if the test signal is substantially the same as an authenticating signal of the authenticatable polymer.

2. (Original) The method of claim 1 wherein the step of determining the test signal further comprises measuring at least one of reflection, emission, fluorescence, or luminescence.

3. (Previously Presented) The method of claim 2 wherein the step of determining the test signal further comprises using an analytical technique that is at least one of fluorescence spectroscopy, luminescence spectroscopy, vibrational spectroscopy, or electronic spectroscopy.

4. (Original) The method of claim 3 wherein the step of determining the test signal further comprises using an analytical technique that is at least one of fluorescence spectroscopy or luminescence spectroscopy.

5. (Previously Presented) The method of claim 1 wherein the thermochromic compound is present in the authenticatable polymer in an amount of no more than or equal to about 10 weight percent, based on the authenticatable polymer.

6. (Previously Presented) The method of claim 5 wherein the thermochromic compound is present in the authenticatable polymer in an amount of less than or equal to about 5 weight percent, based on the authenticatable polymer.

7. (Cancelled)

8. (Previously Presented) The method of claim 7 wherein the thermochromic compound is present in the authenticatable polymer in an amount of less than or equal to about 1 weight percent, based on the authenticatable polymer.

9. (Original) The method of claim 8 wherein the thermochromic compound is present in the authenticatable polymer in an amount of at least 0.005 weight percent, based on the authenticatable polymer.

10. (Original) The method of claim 1 wherein the thermochromic compound is present in the authenticatable polymer in an amount that does not provide a visually retrievable thermochromic response.

11. (Original) The method of claim 1 wherein the substrate polymer is polycarbonate.

12. (Original) The method of claim 1 wherein the authenticating wavelength is at least one of an excitation wavelength, a maximum excitation wavelength, or a range of excitation wavelengths.

13. (Original) The method of claim 12 wherein the authenticating wavelength is an excitation wavelength of from 250 nm to 800 nm.

14. (Previously Presented) The method of claim 12 wherein the test signal is a least one of intensity of fluorescence, shape of a fluorescence peak, location of a fluorescence peak, duration or decay of fluorescence over time or after removal of a heat source, the ratio of fluorescence intensity at at least two different wavelengths, and combinations thereof.

15. (Original) The method of claim 1 wherein the stimulus is a direct stimulus.

16. (Original) The method of claim 15 wherein the stimulus is a heat source that transfers thermal energy via a heated fluid.

17. (Original) The method of claim 1 wherein the stimulus is an indirect stimulus.

18. (Original) The method of claim 17 wherein the stimulus comprises a source of electromagnetic radiation.

19. (Original) The method of claim 18 wherein the authenticatable polymer further comprises a component that absorbs electromagnetic radiation and converts it to heat.

20. (Original) The method of claim 19 wherein the authenticatable polymer comprises a NIR absorber.

21. (Previously Presented) The method of claim 1 wherein the authenticatable polymer further comprises an amplification compound, and wherein an authenticating signal of the authenticatable polymer is greater than the second signal of the thermochromic compound as a result of the amplification compound.

22. (Original) The method of claim 21 wherein the amplification compound is at least one of an organic fluorophore, an inorganic fluorophore, an organometallic fluorophore, or a luminescent nanoparticle.

23. (Previously Presented) The method of claim 21 wherein the amplification compound is present in the authenticatable polymer in an amount of about 10^{-18} to about 2 weight percent, based on the weight of the authenticatable polymer.

24. (Cancelled)

25. (Previously Presented) The authenticatable polymer of claim 27 wherein the thermochromic compound is present in an amount of less than 0.50 weight percent, based on the weight of the authenticatable polymer.

26. (Previously Presented) The authenticatable polymer of claim 27 wherein the thermochromic compound is present in an amount of about 0.005 to about 0.50 weight percent, based on the weight of the authenticatable polymer.

27. (Previously Presented) An authenticatable polymer, comprising:

a substrate polymer;

a thermochromic compound having a first signal at a first temperature and at an authenticating wavelength, and a second signal at an authenticating temperature and the authenticating wavelength, the first and second signals being different, and the authenticating temperature being greater than the first temperature, and

an amplification compound, wherein an authenticating signal of the authenticatable polymer is greater than the second signal of the thermochromic compound as a result of the amplification compound;

wherein the thermochromic compound is present in the authenticatable polymer in an amount of 0.001 to 0.50 weight percent, based on the weight of the authenticatable polymer.

28. (Original) The authenticatable polymer of claim 27 wherein the amplification compound is at least one of an organic fluorophore, an inorganic fluorophore, an organometallic fluorophore, or a luminescent nanoparticle.

29. (Original) The authenticatable polymer of claim 27 wherein the amplification compound is present in the authenticatable polymer in an amount of about 10^{-18} to about 2 weight percent, based on the weight of the authenticatable polymer.

30 – 31 (Cancelled)

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32. (Previously Presented) The method of claim 35 wherein forming the article from the authenticatable polymer comprises melting the authenticatable polymer.

33. (Original) The method of claim 32 further comprising extruding or molding the authenticatable polymer.

34. (Original) The method of claim 33 wherein said molding comprises injection molding the authenticatable polymer.

35. (Currently Amended) A method of making an authenticatable polymer, comprising:

incorporating together a polymer and a thermochromic compound to provide an authenticatable polymer, wherein the thermochromic compound is incorporated in an amount of 0.001 to 0.50 weight percent, based on the weight of the authenticatable polymer; and

forming ~~an authenticatable article~~ an optical disk substrate from the authenticatable ~~polymer;~~ polymer.

~~wherein the authenticatable article is an optical disk.~~

36. (Cancelled)

37. (Currently Amended) ~~The~~ An optical disk made from the method of Claim 35, wherein the optical disk further comprises a reflective layer.

38. (Cancelled)

39. (Original) The authenticatable article of claim 38 wherein the substrate made from the authenticatable polymer is a read through substrate.

40. (Original) The authenticatable article of claim 37 having two substrates made from the authenticatable polymer.